

Contemporary Peer Code Review Practices in Research Software



Oak Ridge
November 8, 2019

Jeffrey C. Carver
University of Alabama

```
// file: IVR.CPP
void IVR()
1 {
2     //press 1 for account balance, 2 for last transaction,
3     //3 for last statement, any other for operator
4     play_prompt();
5
6
7     int key_pressed= get_user_choice();
8     if(key_pressed ==1)
9     {
10        play_account_balance();
11    }
12    else if(key_pressed =2)
13    {
14        play_last_transaction();
15    }
16
17    else if(key_pressed ==3)
18    {
19        play_last_statement();
20    }
21
22    else transfer_to_operator();
}
```

Assignment operator
instead of comparison

```
1 //file: printer.java
2 if (user.isAuthenticated)
3 {
4     userAccess = checkUserAuthorization(user);
5
6     //if user has access to printer
7     if(user.isAuthenticated && userAccess.printer)
8         printUsageReport ();
9     else
10        emailUsageReport ();
11 }
```

Redundant check

Do you think only novice developers
make these mistakes?

```
#define CDMA_SUBSCRIPTION_SOURCE_NV 0
#define CDMA_SUBSCRIPTION_SOURCE_RUIM 1
```

80
81
82

Sep 13, 2010

the functions below operate on an AModem object, so should be named amodem_switch technology(), amodem_set_cdma_xxxx

Reply ... Reply 'Done'

Sep 23, 2010

Done

Reply ... Reply 'Done'

```
static const char* switchTechnology(AModem modem, AModemTech newtech, int32 t newpreferred)
static int set_cdma_subscription_source( AModem modem, ACdmaSubscriptionSource ss);
static int set_cdma_prl_version( AModem modem, int prlVersion);
```

83
84
85
86

```
if (noMedia) {  
    // In case the file is known and now is under a  
    // .nomedia folder mark as not seen in order to  
    // be removed from files table in the post scan.  
    if (entry != null && noMedia) {
```

478
479
480
481
482

[REDACTED]

Jan 15, 2012

Isn't '&& noMedia' redundant? noMedia can only be true inside the if block.

Reply ... Reply 'Done'

[REDACTED]

Jan 16, 2012

Thanks [REDACTED] My bad :D

Reply ... Reply 'Done'

```
        entry.mSeenInFileSystem = false;  
    }  
    return null;  
}
```

483
484
485
486
487

#13244

```
02 >>         if ((nbytes=recvfrom(fd,msgbuf,MSGBUFSIZE,0,
63 >>             >>             (struct sockaddr *) &addr,&
64 >>             perror("recvfrom");
65 >>             exit(1);
66 >>         }
        puts(msgbuf);
```

Feb 8, 2010

Isn't there a risk of msgbuf not being terminated? Reading all the way to MSGBUFSIZE seems to risk overwriting the implicit init done, or does the kernel always null-terminate the buffer, even if it is larger than MSGBUFSIZE?

I guess the worst case scenario is puts going off on a tangent, so probably not particularly dangerous, but still?

Reply

Done

Feb 9, 2010

You are absolutely right. I will change it to write() the number of bytes received. I only tested it with the other file (sender.c) which sends "Hello, world" with the null-byte attached. I will send a patch when I get home. Thanks for the review!

```
54 » » if ( $this->isPermalink ) {
55 » » » $html .= Linker::link(
56 » » » » » SpecialPage::getTitleFor( 'ArticleFeedbackv5', $record[0]->p
age_title ),
57 » » » » » wfMessage( 'articlefeedbackv5-special-goback' )->text());
```

██████████ Apr 17, 2012

And this unfixes a security bug that was fixed earlier: this must be ->escaped(), not ->text(), because the second param to link() is HTML.

██████████ Apr 17, 2012

Done



You might be an Internet 'solopreneur', a lone wolf who writes, edits, formats, checks and publishes your own content. Or you might work for a ~~company~~ website, either as a content creator or as a ~~production~~ editor, sub-editor or editor - the person in charge of quality control and tasked to edit/proofread ~~work~~ ^{the} produced by your colleagues.

Not you? Maybe you want to self-publish a book on Amazon, check through a student essay or thesis, perhaps error-check a company report? Maybe you're ~~involved~~ ^{involved} in creating a brochure, newsletters, business cards, product packaging or signs? Not you either? What about sending an email, posting a Tweet or updating Facebook? They all involve words. Is everything you've typed recently correct? Are you certain? ^{It's not always easy to spot errors.}

You might not have a proofreading process. Or you might be already be actively proofreading and want to get better at it.

^{And forgotten} If you publish or print words of any kind, you won't want any mistakes to slip through. You want to ensure that what you produce is the best that it can be. This is especially true if you are printing anything. Mistakes on the web can be corrected. You don't have that luxury with print. Print has permanency. Just think how you'd feel if you'd been the sign writer who painted 'SHCOOL' in big white letters on the road when you meant to spell 'SCHOOL'. Or that you'd given the OK to a sign that read 'DRIVE-THRU ENTERANCE'. These are real examples. You'll find more proofreading howlers like these later in this book. ^{possibly} ^{!!!}

^a ~~Again~~ proofreading is an essential part of the publishing process. The larger the font, the more you should check it. The more permanent the publication or installation, the more you should check it. You should check and re-check everything you plan to publish until your eyes ache or until the words start to look incorrect and you have to look them up again just to make sure that you're not going crazy. And if you have time for a re-re-check, so much the better. ^{the words}



Where does it fit?

Other Activities

Code Review



Code Review Goals



```
43 <body <?php body_class()></div>
44 <div id="fb-root"></div>
45 <script>(function(d, s, id) {
46   var js, fjs = d.getElementsByTagName(s)[0];
47   if (d.getElementById(id)) return;
48   js = d.createElement(s); js.id = id;
49   js.src = "//connect.facebook.net/en_US/sdk.js#xfbml=1&version=v2.6&appId=2896486362811";
50   fjs.parentNode.insertBefore(js, fjs);
51 })(document, 'script', 'facebook-jssdk');</script>
52 <div id="page" class="site">
53   <a class="skip-link screen-reader-text" href="#content"><?php esc_html_e( 'Skip to content', 'vrdutube' ); ?></a>
54
55   <header id="masthead" class="site-header" role="banner">
56     <div class="site-branding">
57       <div class="navBtn pull-left">
58         <?php if( is_home() && $xpanel['homepage-style'] == 1 ) { ?>
59         <a href="#" id="openMenu"><i class="fa fa-bars fa-3x"></i>
60         <?php } else { ?>
61         <a href="#" id="openMenu2"><i class="fa fa-bars fa-3x"></i>
62         <?php } ?>
63       </div>
64       <div class="logo pull-left">
65         <a href="<?php echo esc_url( home_url() ) ?>">
66         
67       </a>
68     </div>
69     <div class="search-box hidden-xs hidden-sm pull-left ml-1">
70       <?php get_search_form(); ?>
71     </div>
72     <div class="submit-btn hidden-xs hidden-sm pull-left ml-1">
73       <a href="<?php echo get_page_link($xpanel['submit-link']) ?>">
74     </div>
75     <div class="user-info pull-right mr-10">
76       <?php
77       if ( is_user_logged_in() ) {
78         <?php echo esc_html( get_current_user_id() );>
79       }
80     </div>
81   </div>
82 </div>
83 </body></div>
```



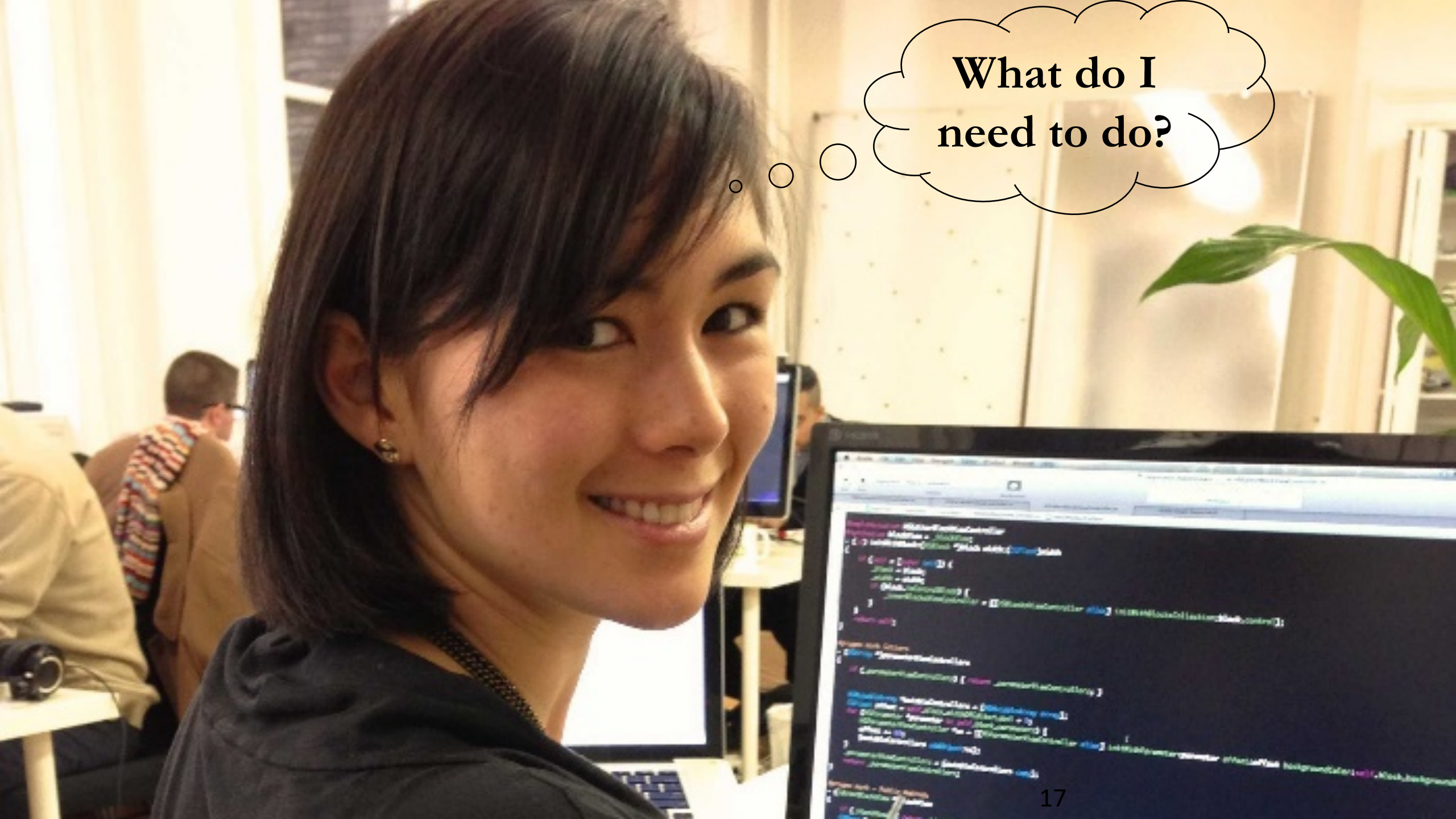
Code Review Goals

- Team building
 - Better shared understanding
 - Team cohesion
 - Peer impression
- Code Quality
 - Find/fix defects early
 - Identify common problems
 - Different perspectives
 - Consistency in code/design
 - More maintainable code
- Personal
 - Learning



Goal is for peace and harmony
in the team, not antagonism.

Code Review Practices

A woman with dark hair and bangs is smiling and looking towards the camera. She is in an office setting, with a computer monitor in the foreground showing code. A thought bubble above her head contains the text "What do I need to do?".

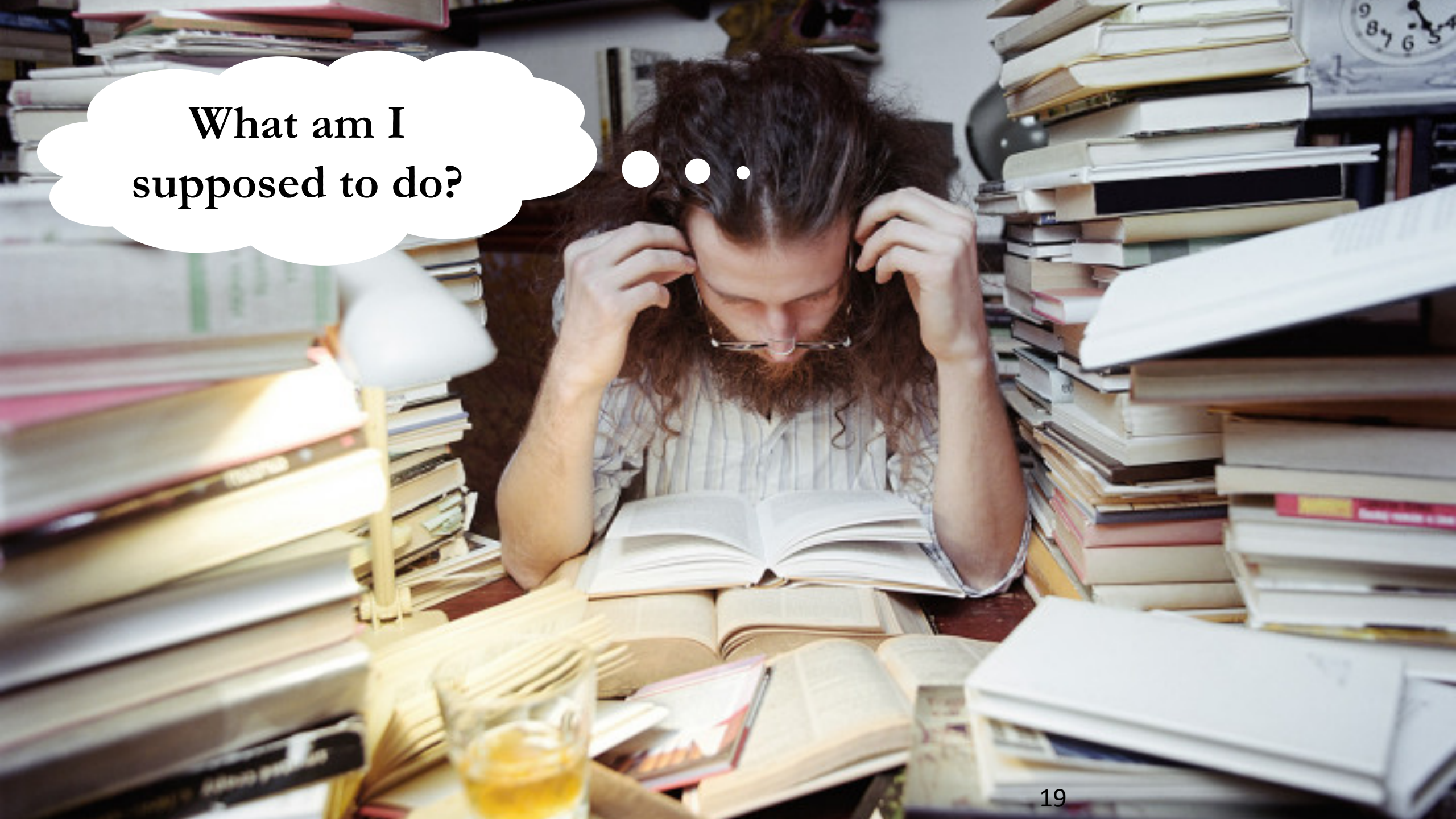
**What do I
need to do?**

For The Developer

- Realize that the goal of code review is to improve the overall code, not to evaluate the quality or worth of the developer
- Remove the fear of making mistakes and create an atmosphere where admitting and fixing is OK
- You are not your code
- Be humble
 - You will make mistakes, we all do
 - Someone else will always know more, it's ok, learn from them
 - People bring different perspectives, that's a good thing
- Fight for what you believe, but gracefully accept defeat

**What am I
supposed to do?**

• • •



For The Reviewer

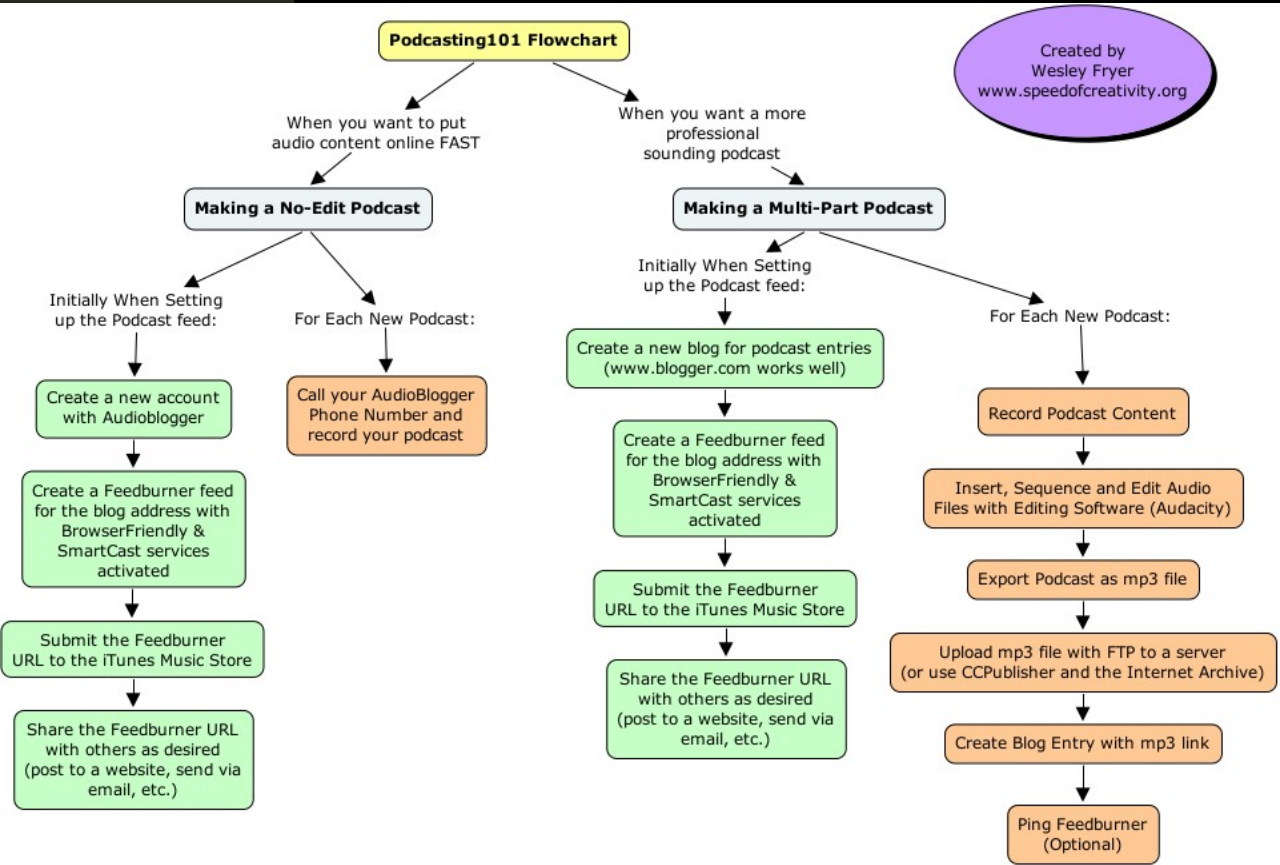
- Focus on the code not the author
 - Use “I” statements rather than “you” statements
 - Criticize the author’s behavior, not their attributes
 - Talk about the code, not the coder
- Ask questions rather than make statements – avoid “why” questions
- Accept that there are different solutions
- Choose carefully which battles to fight
- Remember to praise good code
- Take your time and do it well

Code Review Techniques

```
43 <body <?php body_class() { } ></body></div>
44 <div id="fb-root"></div>
45 <script>(function(d, s, id) {
46   var js, fjs = d.getElementsByTagName(s)[0];
47   if (d.getElementById(id)) return;
48   js = d.createElement(s); js.id = id;
49   js.src = "//connect.facebook.net/en_US/sdk.js#xfbml=1&version=v2.6&appId=298644436198717";
50   fjs.parentNode.insertBefore(js, fjs);
51   }(document, 'script', 'facebook-jssdk'));</script>
52 <div id="page" class="site">
53   <a class="skip-link screen-reader-text" href="#content"><?php esc_html_e( 'Skip to content', 'wrdutube' ); ?></a>
54   <header id="masthead" class="site-header" role="banner">
55     <div class="site-branding">
56       <div class="navBtn pull-left">
57         <?php if(is_home() && $xpanel['homepage-style'] == 1) { ?>
58         <a href="#" id="openMenu"><i class="fa fa-bars fa-3x"></i></a>
59         <?php } else { ?>
60         <a href="#" id="openMenu2"><i class="fa fa-bars fa-3x"></i></a>
61         <?php } ?>
62       </div>
63       <div class="logo pull-left">
64         <a href="<?php echo esc_url( home_url() ) ?>">
65           
66         </a>
67     </div>
68     <div class="search-box hidden-xs hidden-sm pull-left ml-10">
69       <?php get_search_form(); ?>
70     </div>
71     <div class="submit-btn hidden-xs hidden-sm pull-left ml-10">
72       <a href="<?php echo get_page_link($xpanel['submit-link']) ?>" class="head
73     </div>
74     <div class="user-info pull-right mr-10">
75       <?php
76       if ( is_user_logged_in() ) {
```

Code

Algorithms



What to Examine

- Examine the code
 - Is the code readable to a human?
 - Are variables and method names clear?
 - Is there sufficient documentation for someone to come back 6 months later (or someone new) to understand what the code is doing?
- Examine the algorithms in detail
 - Are there any hidden assumptions, not specified, that could cause problems?
 - Are there edge cases that may not work?
 - What happens with bad or missing data?
 - Does the algorithm do what it is supposed to? – Use stepwise abstraction

Example - Stepwise Abstraction

- Examine the algorithm embedded in the code
- Start at the bottom, extract low-level functionality
- Group low-level functionality into higher-level
- At top level, compare with desired plan


```
while ((a>b) || (b>c) || (c>d))
{
  if(b>a)
  {
    i = b;
    b = a;
    a = i;
  }
  if(c>b)
  {
    i = c;
    c = b;
    b = i;
  }
  if(d>c)
  {
    i = d;
    d = c;
    c = i;
  }
}
```

As long as "a", "b", "c", and "d" are not in descending order

Assign "b" to "i"
Assign "a" to "b"
Assign "i" to "a"

Replace "a" and "b"

Rearrange "a" and "b" in descending order

Assign "c" to "i"
Assign "b" to "c"
Assign "i" to "b"

Replace "b" and "c"

Rearrange "b" and "c" in descending order

Assign "d" to "i"
Assign "c" to "d"
Assign "i" to "c"

Replace "c" and "d"

Rearrange "c" and "d" in descending order

Requirement: Rearrange "a", "b", "c", and "d" in descending order

Code Review Comment Exercise

“You are writing cryptic code”

“Its hard for me to grasp what is
going on in the code”

Use I-Messages

**“This is not how I would have solved
the problem”**

**“Why did you use this approach rather
than approach X?”**

Ask questions where possible

“You are sloppy when it comes
to writing tests”

“I believe that you should pay more
attention to writing tests”

**Criticize the author’s
behavior, not the author**

“You’re requesting the serve
multiple times, which is inefficient”

“This code is requesting the service
multiple times, which is inefficient”

Talk about the code, not the coder

“I always use fixed timestamps in tests and you should too”

“I would always use fixed timestamps in tests for better reproducibility, but in this simple test, using the current timestamp is also ok”

Accept different solutions

Issues Identified in code review



The Project Agreement
Review Board for the team
on the 10th of the 10th
To meet tomorrow with
the customer's help
Easier MTF showed
the team in the field
to be done in 2014

Meeting for Core 2014
- Core - 2014
- Core - 2014
- Core - 2014

Wifi Password

Issues Identified during code reviews

- Misunderstood requirements
- Project design violations
- Coding style
- Critical security defects
- Unsafe methods
- Inefficient code
- Malicious code
- Inadequate input validation
- Lack of exception handling

Developer

Checklist

- My code compiles
- My code has been tested and has unit tests
- My code includes appropriate comments
- My code is tidy / follows coding standard
- I have documented corner cases
- I have documented workarounds
- ...
-

Reviewer

Checklist

- Comments are understandable and appropriate
- Comments are neither too many or too few
- Exceptions are appropriately handled
- Repetitive code has been factored out
- Frameworks have been used appropriately
- Functionality fits the design/architecture
- Code is testable
- Code compiles

Code Review

BEST

PRACTiCE



Code Review Best Practice

- Practice lightweight code reviews.
- Review fewer than 400 lines of code at a time.
- Inspection rate should be under 500 LOC per hour.
- Do not review for more than 60 minutes at a time.
- Set goals and capture metrics.
- Authors should annotate source code before review.
- Use checklists.
- Establish a process for fixing defects found.
- Foster a positive code review culture.
- Embrace the subconscious implications of peer review.

Research Code Review?



Research Code Review

- Cultural difference between scientific community and software engineering community
- Correct results are unknown in many cases
- Testing is extensively complex in scientific software
- Common testing approaches may not fit
- May be better to review the scientific algorithm than to extensively test code
- Lack of proper testing knowledge
- Test to check the science, not the software
- Tend to test when development is about to finish

Our Results



Findings

- Identified a lot of problems beyond style, structure, and bugs. 70 types of problems found during code review
- Helps produce consistent style and readable code
- Underlying science is more important than code quality
- People had positive experiences including:
 - Learning from others
 - Understanding the whole project
 - Different points of view
 - Better overall solutions
- People have negative experiences
 - Most related to negative comments
 - Slows the process down
 - Hard to find good reviewers
 - Different levels of expertise in team
 - Many just don't like to do it or have their code reviewed

Typical Code Review Workflow



Writes

```
string ...
if(parameters.contains("name")){
    hql += " and p.name = :name";
}
8 if(parameters.contains("age")){
9     hql += " and p.age = :age";
10 }
11 TypedQuery<Person> query = em.createQuery(hql, Person.class);
12 if(parameters.contains("name")){
13     query.setParameter("name", values[0].toString());
14 }
15 if(parameters.contains("age")){
16     query.setParameter("age", Integer.valueOf(values[1].toString()));
}
return query.getResultList();
```



Requests
Review



Writes

```
string ...
if(parameters.contains("name")){
    hql += " and p.name = :name";
}
8 if(parameters.contains("age")){
9     hql += " and p.age = :age";
10 }
11 TypedQuery<Person> query = em.createQuery(hql, Person.class);
12 if(parameters.contains("name")){
13     query.setParameter("name", values[0].toString());
14 }
15 if(parameters.contains("age")){
16     query.setParameter("age", Integer.valueOf(values[1].toString()));
}
return query.getResultList();
```



Reviews

```
PAGE 111 SHEP APPLE DOS

3573          WBOOT          PAGE
3574 3755 ADF137      LDA  IBBUFF+1      ; GET START OF DOS
3575 3758 BDE337      STA  BONDOS       ; SAVE IT
3576 3758 38         SEC
3577 375C ADE737      LDA  ADOSLD+1     ; CALCULATE
3578 375F EDE337      SBC  BONDOS
3579 3762 BDE037      STA  NDPGS       ; NO DOS PAGES
3580 3765 BDE237      STA  ESDEPC
3581
3582 3768 A900        LDA  #0
3583 376A BDE037      STA  IBTRK       ; TRACK=0
3584 376D BDE037      STA  IBSECT     ; SECTOR=0
3585 3770 BDF037      STA  IBBUFF
3586
3587 3773 ADE737      LDA  ADOSLD+1     ; GET BOOT START ADR
3588 3776 BDF137      STA  IBBUFF+1    ; TO BUFP
3589 3779 BDFE36      STA  GRSPG      ; TO GARBAGE RECORD
3590
3591 377C A90A        LDA  #10
3592 377E BDE137      STA  BRWCNT     ; NO OF BOOT PAGES
3593 3781 0A         ABLA  -L38 #48   ; TO BOOT I/O COUNTER
3594 3782 0A         ASLA  -L38 #48   ; AND
3595 3783 0A         ASLA  #0         ; TO
3596 3784 BDFE36      STA  GRPOC      ; GARBAGE RECORD
3597
3598 3787 A902        LDA  #ISCHTS     ; SET WRITE
3599 3789 BDF437      STA  IBCHD
3600
3601 378C 20F37       JSR  BOOTIO     ; GO WRITE BOOT SECTORS
3602
3603 378F ADE337      LDA  BONDOS     ; SET START OF DOS
3604 3792 BDF137      STA  IBBUFF+1
3605
3606 3795 ADE037      LDA  NDPGS
3607 3798 BDE137      STA  BRWCNT
3608 379B 20F37       JSR  BOOTIO     ; GO WRITE DOS
3609
3610 379E 60         RTS
3611
```



Edits

```
PAGE 111 SHEP APPLE DOS

3573          WBOOT          PAGE
3574 3755 ADF137      LDA  IBBUFF+1      ; GET START OF DOS
3575 3758 BDE337      STA  @BNDOS       ; SAVE IT
3576 375B 3B          SEC
3577 375C ADE737      LDA  ADOSLD+1     ; CALCULATE
3578 375F EDE337      SBC  @BNDOS
3579 3762 BDE037      STA  @NDOS        ; NO DOS PAGES
3580 3765 BDE237      STA  @BNDOS
3581
3582 3768 A900        LDA  #0
3583 376A BDE037      STA  @IBTRK       ; TRACK=0
3584 376D BDE037      STA  @IBSECT     ; SECTOR=0
3585 3770 BDF037      STA  @IBBUFF
3586
3587 3773 ADE737      LDA  ADOSLD+1     ; GET BOOT START ADR
3588 3776 BDF137      STA  IBBUFF+1     ; TO BUFF
3589 3779 BDFE36      STA  @GRSPQ      ; TO GARBAGE RECORD
3590
3591 377C A90A        LDA  #10
3592 377E BDE137      STA  @BRWCNT     ; NO OF BOOT PAGES
3593 3781 0A          ABLA  ]- LDR #48   ; TO BOOT I/O COUNTER
3594 3782 0A          ASLA  ]- LDR #48   ; AND
3595 3783 0A          ASLA  ]- LDR #48   ; TO
3596 3784 BDFE36      STA  @GRPOC      ; GARBAGE RECORD
3597
3598 3787 A902        LDA  @IBCHCTS     ; SET WRITE
3599 3789 BDF437      STA  @IBCHD
3600
3601 378C 209F37      JSR  @BOOTIO     ; GO WRITE BOOT SECTORS
3602
3603 378F ADE337      LDA  @BNDOS
3604 3792 BDF137      STA  IBBUFF+1
3605
3606 3795 ADE037      LDA  @NDOS
3607 3798 BDE137      STA  @BRWCNT
3608 379B 209F37      JSR  @BOOTIO     ; GO WRITE DOS
3609
3610 379E 60          RTS
3611
```



Reviews

```

PAGE 111 SHEP APPLE DOS
      PAGE
3573 WBOOT
3574 3755 ADF137 LDA IBBUFF+1 ;GET START OF DOS
3575 3758 BDE337 STA BONDOS ;SAVE IT
3576 3758 3B SEC
3577 375C ADE737 LDA ADOSLD+1 ;CALCULATE
3578 375F EDE337 SBC BONDOS
3579 3762 BDE037 STA NDPGS ;NO DOS PAGES
3580 3765 BDE237 STA ESDEPC
3581
3582 3768 A900 LDA #0
3583 376A BDE037 STA IBTRK ;TRACK=0
3584 376D BDE037 STA IBSECT ;SECTOR=0
3585 3770 BDF037 STA IBBUFF
3586
3587 3773 ADE737 LDA ADOSLD+1 ;GET BOOT START ADR
3588 3776 BDF137 STA IBBUFF+1 ;TO BUFP
3589 3779 BDFE36 STA GRSPG ;TO GARBAGE RECORD
3590
3591 377C A90A LDA #10
3592 377E BDE137 STA BRWCNT ;TO BOOT I/O COUNTER
3593 3781 0A A945 ABLA ;AND
3594 3782 0A EA ASLA ;LDR #48 ;TO
3595 3783 0A ASLA ;AND
3596 3784 BDFE36 STA GRPOC ;GARBAGE RECORD
3597
3598 3787 A902 LDA #IBCHTS ;SET WRITE
3599 3789 BDF437 STA IBCHD
3600
3601 378C 209F37 JSR BOOTIO ;GO WRITE BOOT SECTORS
3602
3603 378F ADE337 LDA BONDOS ;SET START OF DOS
3604 3792 BDF137 STA IBBUFF+1
3605
3606 3795 ADE037 LDA NDPGS
3607 3798 BDE137 STA BRWCNT
3608 379B 209F37 JSR BOOTIO ;GO WRITE DOS
3609
3610 379E 60 RTS ;DONE
3611
  
```



Edits

Reviews

```
PAGE 111 SHEP APPLE DOS
PAGE
3573 WBOOT
3574 3755 ADF137 LDA IBBUFF+1 ;GET START OF DOS
3575 3758 BDEC37 STA BONDOS ;SAVE IT
3576 3758 3B SEC
3577 375C ADE737 LDA ADOSLD+1 ;CALCULATE
3578 375F EDE337 SBC BONDOS
3579 3762 BDEC37 STA NDPGS ;NO DOS PAGES
3580 3765 BDEC37 STA BNDSEC
3581
3582 3768 A900 LDA #0
3583 376A BDEC37 STA IBTRK ;TRACK=0
3584 376D BDEC37 STA IBSECT ;SECTOR=0
3585 3770 BDF037 STA IBBUFF
3586
3587 3773 ADE737 LDA ADOSLD+1 ;GET BOOT START ADR
3588 3776 BDF137 STA IBBUFF+1 ;TO BUFP
3589 3779 BDFE36 STA GRSPQ ;TO GARBAGE RECORD
3590
3591 377C A90A LDA #10
3592 377E BDE137 STA BRWCNT ;NO OF BOOT PAGES
3593 3781 0A A945 ABLA BRWCNT ;TO BOOT I/O COUNTER
3594 3782 0A EA ABLA -LDR #48 ;AND
3595 3783 0A ABLA ;TO
3596 3784 BDFE36 STA GRPOC ;GARBAGE RECORD
3597
3598 3787 A902 LDA #IBCHTS ;SET WRITE
3599 3789 BDF437 STA IBCHD
3600
3601 378C 209F37 JSR BOOTIO ;GO WRITE BOOT SECTORS
3602
3603 378F ADE337 LDA BONDOS ;SET START OF DOS
3604 3792 BDF137 STA IBBUFF+1
3605
3606 3795 ADE037 LDA NDPGS
3607 3798 BDE137 STA BRWCNT
3608 379B 209F37 JSR BOOTIO ;GO WRITE DOS
3609
3610 379E 60 RTS ;DONE
3611
```




```

PAGE 111 SHEP APPLE DOS
3573          WBOOT          PAGE
3574 3755 ADF137      LDA  IBBUFF+1      ;GET START OF DOS
3575 3758 BDE337      STA  @BNDOS       ;SAVE IT
3576 375B 3B          SEC
3577 375C ADE737      LDA  ADOSLD+1     ;CALCULATE
3578 375F EDE337      SBC  @BNDOS
3579 3762 BDE037      STA  @NDOS        ;NO DOS PAGES
3580 3765 BDE237      STA  @SDSEC
3581
3582 3768 A900        LDA  #0
3583 376A BDE037      STA  @IBTRK       ;TRACK=0
3584 376D BDE037      STA  @IBSECT     ;SECTOR=0
3585 3770 BDF037      STA  IBBUFF
3586
3587 3773 ADE737      LDA  ADOSLD+1     ;GET BOOT START ADR
3588 3776 BDF137      STA  IBBUFF+1     ;TO BUFP
3589 3779 BDFE36      STA  @GRSPQ      ;TO GARBAGE RECORD
3590
3591 377C A90A        LDA  #10          ;NO OF BOOT PAGES
3592 377E BDE137      STA  @BRWCNT     ;TO BOOT I/O COUNTER
3593 3781 0A          ABLA  -L38 #48   ;AND
3594 3782 0A          ASLA  ;TO
3595 3783 0A          ASLA  @SD        ;GARBAGE RECORD
3596 3784 BDFE36      STA  @GRPOC
3597
3598 3787 A902        LDA  @IBSCTS      ;SET WRITE
3599 3789 BDF437      STA  @IBCHD
3600
3601 378C 209F37      JSR  @BOOTIO     ;GO WRITE BOOT SECTORS
3602
3603 378F ADE337      LDA  @BNDOS
3604 3792 BDF137      STA  IBBUFF+1
3605
3606 3795 ADE037      LDA  @NDPS
3607 3798 BDE137      STA  @BRWCNT
3608 379B 209F37      JSR  @BOOTIO     ;GO WRITE DOS
3609
3610 379E 60          RTS
3611

```

Merge



Abandon



Mailing List Code Review

From [REDACTED]
Subject [patch] Fix cross-user symlink race condition vulnerability
Date Wed, 31 Oct 2012 04:46:47 GMT

There is a race condition vulnerability in httpd 2.2.23 (also present in previous releases) that allows a malicious user to serve arbitrary files from nearly anywhere on a server that isn't protected by strict os level permissions. In a shared hosting environment, this is a big vulnerability.

If you would like more information on the exploit itself, please let me know. I have a proof of concept that is able to hit the exploit with 100% success.

This is my first patch submitted to Apache, so I'm sorry if I've missed something. I'm aware that this doesn't meet some of the code standards that are in place (e.g, it doesn't work at all on Windows), but I wanted to put it out there anyway.

The patch that fixes the vulnerability is attached. Thank you in advance for the feedback.

--

[REDACTED]
Senior System Administrator
[REDACTED]

Mime

- Unnamed multipart/mixed (inline, None, 0 bytes)
 - [Unnamed text/plain](#) (inline, 7-Bit, 857 bytes)
 - [httpd-2.2.23-symlink-protection.patch](#) (text/x-patch) (attachment, 7-Bit, 8324 bytes)

[View raw message](#)

Pull Requests

Fix a small bug in a project in GitHub Pull Requests

```
#git clone https://github.com/project/code ; cd code
```

```
#vi some.c
```

```
#git commit -a -m 'Fix the frobinator'
```

```
#go to web UI
```

```
#click fork
```

```
#git remote add me https://github.com/$USER/code
```

```
#git push me master
```

```
#go to web UI
```

```
#create pull request
```

Contemporary Code Reviews



Code Review Tools

Code Review Tools



Gerrit: <https://code.google.com/p/gerrit/>



Review Board: <https://www.reviewboard.org/>



Phabricator: <https://phabricator.org/>



Crucible:

<https://www.atlassian.com/software/crucible>

References for further reading

- *Code Complete*, by Steve McConnell
- <https://www.codeproject.com/articles/524235/codeplus-reviewplusguidelines>
- <https://blog.philippbauer.de/code-review-guidelines>
- <https://github.com/joho/awesome-code-review>
- <https://www.planetgeek.ch/wp-content/uploads/2013/06/Clean-Code-V2.1.pdf>

<http://URSSI.US>



URSSI

Developing a pathway to
research software sustainability

US
RSE

US RESEARCH
SOFTWARE ENGINEER
ASSOCIATION

<https://us-rse.org/>



@us_rse

Collaborate?



@SE4Science



Jeffrey Carver
carver@cs.ua.edu

<http://BSSw.io>

Photo Credits

- <http://incolors.club/collectionfdwn-female-computer-programmer.htm>
- <http://tech.trivago.com/img/posts/code-review/code-review-3.jpg>
- <http://www.protectitip.com/wp-content/uploads/2014/11/Software-Code.jpg>
- http://www.computerhistory.org/atchm/wp-content/uploads/2013/11/marked_up_listing-542x404.jpg
- <https://static1.squarespace.com/static/53798babe4b0fca9449cf693/t/53f78774e4b0ce4d05e4152f/1408730997720/>
- <https://residentialwastesystems.com/wp-content/uploads/2016/10/dumpsters-trumbull-ct.jpg>
- <http://www.hipaasecurenw.com/index.php/beckers-hipaa-compliance-8-best-practices/>
- [https://commons.wikimedia.org/wiki/File:Collaboration_\(9601759166\).jpg#metadata](https://commons.wikimedia.org/wiki/File:Collaboration_(9601759166).jpg#metadata)
- <http://entertainment.time.com/2012/05/09/confessions-of-another-book-reviewer/>